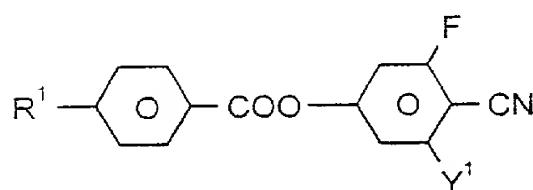


Patent Claims

1. An electro-optical liquid-crystal display comprising
5 a layer of liquid-crystal medium between two substrates with alignment layers on inside surfaces of each of said substrates; the liquid-crystal layer having a twist angle, from one substrate to the other, of 110°-360°;
10 the liquid-crystal layer having a surface tilt angle of 2°-20°; and each of said alignment layers having a thickness of 3 nm-150 nm.
- 15 2. A display according to claim 1, at least one of said alignment layers has a layer thickness of 4 nm-60 nm.
- 20 3. A display according to claim 2, wherein the difference from 1 of the steepness of the electric-optical characteristic line, represented by the formula $V_{90}/V_{10}-1$, is half or less of the corresponding value of an otherwise identical display in which the layer thicknesses of each of the alignment layers is 100 nm.
- 25 4. A display according to claim 1, wherein the steepness of the electro-optical characteristic line V_{90}/V_{10} is 1.06 or less.
- 30 5. A display according to claim 1, wherein the threshold voltage (V_{10}) of the display is 1.20 V or less.
- 35 6. A display according to claim 1, wherein said liquid-crystal medium comprises one or more compound(s) of formula I



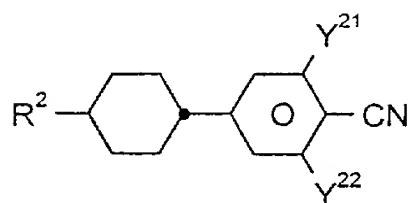
I

wherein

5 R^1 is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon atoms, and

10 Y^1 is H or F.

15 7. A display according to claim 1, wherein said liquid crystal medium comprises at least one compound of formula II



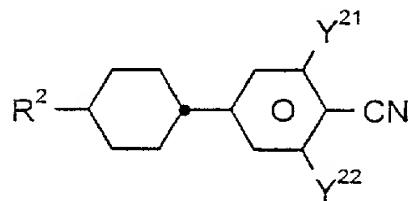
II

wherein

20 R^2 is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon atoms, and

25 Y^{21} and Y^{22} are each, independently, H or F.

30 8. A display according to claim 6, wherein said liquid crystal medium comprises at least one compound of formula II



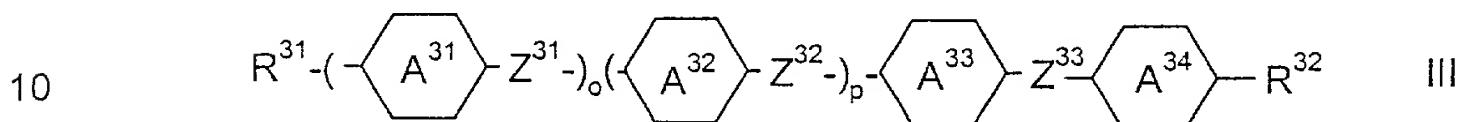
II

wherein

R^2 is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon atoms, and

5 Y^{21} and Y^{22} are each, independently, H or F.

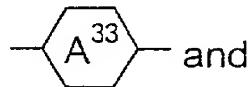
9. A display according to claim 6, wherein said liquid crystal medium comprises at least one compound of formula III



wherein

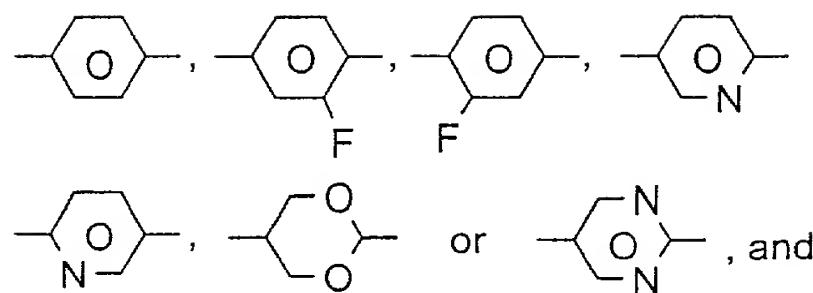
15 R^{31} and R^{32} are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl, having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

20 Z^{31} , Z^{32} and Z^{33} are each, independently of one another, $-\text{CH}_2\text{CH}_2-$, $-\text{CH}=\text{CH}-$, $-\text{COO}-$ or a single bond,



30
$$- \text{A}^{34} -$$
 are each, independently of one another,
$$- \text{C}_6\text{H}_4 -$$
,

5

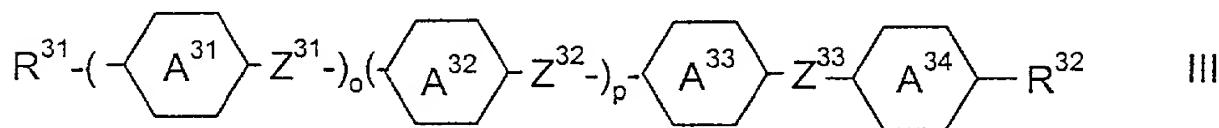


o and p, independently of one another, are 0 or 1.

10

10. A display according to claim 7, wherein said liquid crystal medium comprises at least one compound of formula III

15



wherein

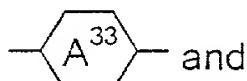
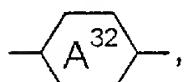
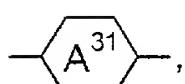
20

R^{31} and R^{32} are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl, having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

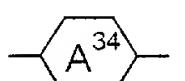
25

Z^{31} , Z^{32} and Z^{33} are each, independently of one another, $-\text{CH}_2\text{CH}_2-$, $-\text{CH}=\text{CH}-$, $-\text{COO}-$ or a single bond,

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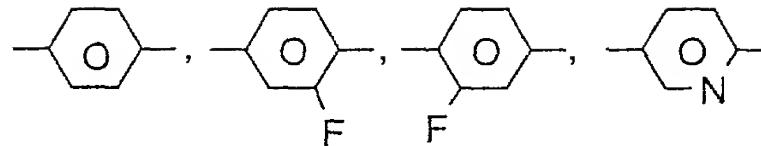


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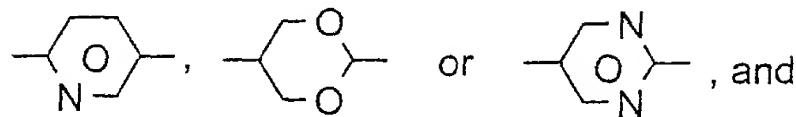


are each, independently of one another,





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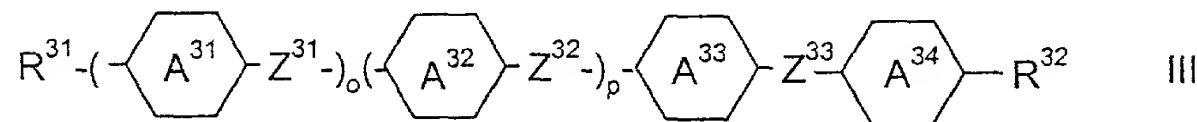


o and p, independently of one another, are 0 or 1.

10

11. A display according to claim 8, wherein said liquid crystal medium comprises at least one compound of formula III

15



wherein

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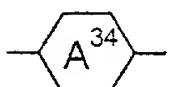
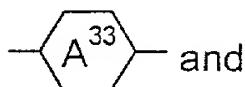
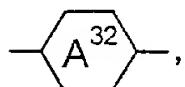
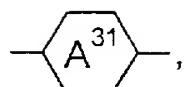
R^{31} and R^{32} are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl, having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

25

Z^{31} , Z^{32} and Z^{33} are each, independently of one another, $-\text{CH}_2\text{CH}_2-$, $-\text{CH}=\text{CH}-$, $-\text{COO}-$ or a single bond,

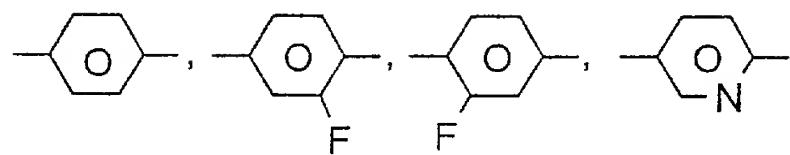
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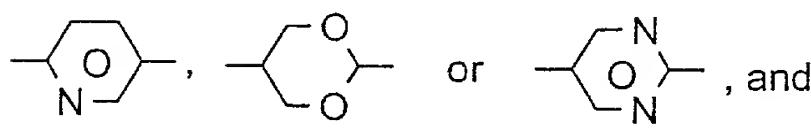


are each, independently of one another,

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o and p, independently of one another, are 0 or 1.

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12. In a method of displaying information using an electro-optical liquid-crystal display, the improvement wherein said display is one in accordance with claim 1.